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Elevation of the Macromia Group to Family Status (Odonata)

By LEONORA K. GLOYD, Illinois Natural History Survey, Urbana

In regard to its assigned suprageneric placement and rank, the *Macromia* group, represented in North America by the genera *Macromia* and *Didymops,* has the history of a misfit. Its composition and the characteristics used to define it have been varied. In rewriting the key to odonate nymphs for the new edition of Ward and Whipple's Fresh Water Biology, I had to consider the status and nomenclature of the taxon. My study is not a complete one, but the evidence found seems to indicate that the *Macromia* group should be raised to the rank of a family under the name of Macromiidae.

HISTORICAL SKETCH

The name *Macromia* was first used as the basis for a taxon above the level of genus by Baron Edm. de Selys Longchamps in his *Synopsis des Cordulines* of 1871. Previously, however, in a "communication verbale" given at the November 5, 1870 meeting of the Société Entomologique de Belgique, Selys reported on the progress of the manuscript for this great work and referred to the same suprageneric taxon as "Légion Epophthalmia." With the receipt and study of additional material in the interval between this meeting and that of the Académie royale des sciences de Belgique on May 9, 1871, at which time his manuscript was submitted for publication, he found it necessary to make a complete revision of his preliminary classification. In the finished work, "Légion Macromia" was used instead of

"Légion Epophthalmia." It included the genera *Idionyx* Selys, *Aeschnosoma* Selys, *Synthemis* Selys, and *Macromia* Rambur with *Epophthalmia* Burmeister as a subgenus. In the *Secondes Additions au Synopsis* (Selys, 1878), *Idionyx* was demoted to subgeneric position under *Macromia,* and *Didymops* Rambur and *Phyllomacromia* Selys were added as subgenera of *Macromia.*

Selys' classification of the Cordulines has been universally followed. Kirby (1890) recognized the subgenera as genera but did not make use of his categories between subfamily and genus. In 1901, the *Macromia* group was given subfamily status by Needham (Needham and Betten, p. 479) who referred to it as "newly set apart" and gave it coordinate rank with Libellulinae and Corduliinae under the family Libellulidae. Subsequent changes may be briefly outlined as follows:

1901 Synthemiinae: Needham and Hart, p. 5 (Libellulidae)
1904 Macromiinae: Needham, p. 698, footnote *a,* Synthemiinae, 1901, an error
1906 Groupe des Macromia: Martin, p. 37 (Cordulines)
1908 Group V: Williamson (Sept.) p. 429 (Cordulinae)
1908 Macromiinae: Needham (Dec.), p. 276 (Libellulidae)
1910 Tribus Macromiini: Muttkowski, p. 118 (Corduliinae)
1910 Group Macromina: Tillyard, p. 329;
Macromiinae: idem, p. 327, fig. 3 (Libellulidae)
1917 Tribe Macromiini: Tillyard, p. 226 (Corduliinae)
1929 Macromiinae: Needham and Heywood, p. 163 (Libellulidae)
1940 Epophthalmiinae: Tillyard and Fraser, p. 389 (Corduliidae)
1955 Macrominae: Needham and Westfall, p. 326 (Libellulidae)
1957 Epophthalmiinae: Fraser, p. 111 (Corduliidae)

In all of this shifting the taxon was given coordinate rank with the highest *Cordulia* group by Needham only. Tillyard and Fraser (1940) and Fraser (1957) were in accord with Needham as to subfamily rank but placed it as a subdivision of the elevated Corduliidae (St. Quentin, 1939, p. 359).

The composition of the *Macromia* group since 1878 (Selys) has undergone some fluctuation. Martin (1906) added three genera—*Idomacromia* Karsch, *Libellulosoma* Martin, and *Ma-*

cromidia Martin. Williamson (1908) added *Azuma* Needham (= *Epophthalmia*), but excluded *Aeschnosoma* and *Idionyx* as well as Martin's three additions. Needham (1908) added *Macromidia* to Williamson's list and left out *Didymops*. Tillyard (1917) placed *Synthemis* in a separate tribe but otherwise his Macromiini was identical with Williamson's Group V. Tillyard and Fraser (1940) excluded the synonym *Azuma* and again added *Macromidia*. Fraser (1957) eliminated *Phyllomacromia* because of synonymy with *Macromia*. Thus the taxon in 1957 was composed of *Didymops, Epophthalmia, Macromia,* and *Macromidia*—essentially the same as Selys' "Genre Macromia" of 1878 but with *Idionyx* replaced by *Macromidia*.

In their reclassification of the Odonata, Tillyard and Fraser (1940, p. 389) described the "Subfamily EPOPHTHALMIINAE nov. subfam." (family Corduliidae). They gave no explanation for discarding the name Macromiinae, nor did Fraser in his revision of this reclassification (1957, p. 111).

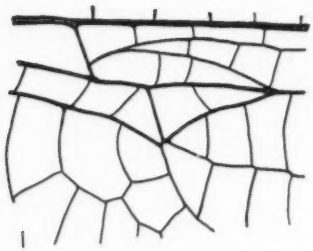
The Family-Group Name

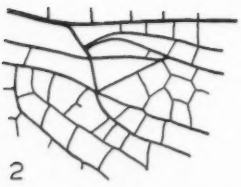
Both *Epophthalmia* Burmeister 1839 and *Macromia* Rambur 1842 were included in Selys' suprageneric "Légion Macromia." The prior description of *Epophthalmia* does not invalidate the selection of *Macromia* as the basis of a Family-Group name. The only other matter of concern then is the use of "Légion Epophthalmia" in Selys' verbal report on the *Synopsis des Cordulines* given at the November 5, 1870 meeting of the Société Entomologique de Belgique. This report (at least in part) and the "extraite d'un tableau synoptique" was recorded in the Comptes-Rendus des Séances, which according to the Zoological Record for 1870 (vol. 7, p. 444) were distributed monthly to members of the society. These were printed, and each one was separately paged. They were later reprinted in the Annales, repaged, and sometimes obviously reorganized and revised. The Annales for 1870–1871 (vol. 14) containing the Comptes-Rendus with the account of Selys' report was published some time after November 4, 1871 as this is the last date of an included paper. The abstract of this preliminary report

and the anticipated classification was also printed in Zoological Record (vol. 7, p. 449) after October 20, 1871, as indicated by the date of the preface. It is likely that the *Synopsis* appeared before either the Annales for 1870–1871 or volume 7 of the Zoological Record. Technically, Selys cannot be considered the author of any of these three accounts. Even if it were otherwise, for the sake of stability the taxon-name used in Selys' finished *Synopsis* should be given preference over the temporary one reported informally, i.e. without a title, in the minutes of a meeting. Tillyard and Fraser (1940) said nothing about priority or restoration of an old name when they proposed Epophthalmiinae. Because some authors never changed to Epophthalmiinae, it is correct to say that *Macromia*, as the basis of a Family-Group name, has been used in the literature for a total, to date, of 89 years. The suprageneric taxa based on the name *Macromia* should be credited to Selys; *Macromia* is the type genus by indication (Selys, 1871, p. 12, 82). Epophthalmiinae, as long as it includes the genus *Macromia*, is to be regarded as a synonym of Macromiinae.

MACROMIIDAE, new status

Diagnosis.—Adult: Occiput well rounded and without a pronounced carina or sharp angle at posterior margin. Hind wing with triangle well separated from arculus, usually by a distance as great or greater than length of upper (costal) side of triangle in front wing; median cell (basilar space) without crossveins; at least one cubito-anal crossvein between level of arculus and proximal side of triangle (fig. 1); upper proximal angle of triangle acute (60° to 80°); tornus angulated in male; anal loop not bisected by a mid-rib. Tarsal claws with the inferior tooth (or hook) about as stout and long as tip of claw, giving the claw the appearance of being bifid (figs. 3 and 4); tibial keels present in males. Abdomen with no lateral or lateroventral carinae on any of the segments; segment 2 of the male with anterior hamules or hamular processes small but distinct (Schmidt, 1915); in the female, vulvar lamina sometimes long but without sawteeth, lateral processes or valves vestigial or absent. Nymphs:





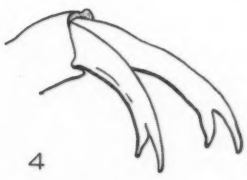


FIG. 1. Section of hind wing of *Macromia taeniolata* Rambur.
FIG. 2. The same of *Libellula quadrimaculata* Linn.
FIG. 3. Tarsal claws of right hind leg of *Macromia illinoiensis* Walsh.
FIG. 4. The same of *Didymops transversa* (Say).

Antennae 7-segmented; top of head with a nipple-like projection or low rounded tubercle near each posterolateral angle, the two projections approximately as widely separated as the lateral elevated margins of the dorsal shield of the prothorax. Labium spoon shaped or semiflattened; ligula entire (concave medianally in mature nymphs of *Epophthalmia* but not cleft). Proventriculus with four plates, the dorsal and ventral pairs dissimilar; ventral plates each with two large spines near margin of mesal ridge, one subapical, the other anterior to it, both directed downward and slightly inward from margin of ridge, and with a series of small teeth or sclerotized scallops on edge of ridge below the large subapical tooth (Ferguson-Beatty, 1958, p. 368, figs. 3 and 4). Mandibles each with two molars in the position of the molar crest (Watson, 1956, p. 189–190).

Macromiidae is similar to Libellulidae (including the Corduliinae, or Corduliidae of some authors) in having the ligula of the labium with the distal margin entire in both nymph and adult, the triangles in front and hind wings dissimilar, and, in the nymph, the dorsal pair of proventricular plates unlike the ventral pair. It differs from the Libellulidae most notably in the position of the triangle of the hind wing, the presence of distinct anterior hamules in the male, the absence of lateroventral carinae on the abdomen (as in Gomphidae, Cordulegastridae, and Petaluridae), and, in the nymph, by the presence of posterolateral tubercles on the head, only two molars on the right mandible, and a unique armature of the ventral pair of proventricular plates. In venation, Macromiidae is most similar to Synthemidae but differs in having no crossveins in the median cell (basilar space).

This diagnosis is based primarily on *Macromia, Didymops,* and *Epophthalmia.* The venational characteristics, at least, seem to apply to *Macromidia,* also. Characteristics have not been fully checked for species in all these genera and undoubtedly the diagnosis and the composition of Macromiidae may require revision with further study. If the formation of the anal loop in *Macromia* is like that described for *Synthemis* nymphs (Tillyard, 1914, p. 172–175), both genera should probably be included in the same family and diagnostic venational characteristics revised. Statements concerning mandibles and the proventriculus are based on Nearctic species of *Didymops* and *Macromia.*

Dr. E. M. Walker has suggested (*in lit.,* Feb. 20, 1956) that perhaps other groups should be taken out of the old subfamily Corduliinae or family Corduliidae as well as the *Macromia* group. It is also possible that some groups need to be put back together again. Certainly Nearctic Corduliinae and Libellulinae are so closely related that they belong in one family, the Libellulidae. Both usually have the anal loop bisected by a mid-rib, proximal side of triangle even with the arculus (fig. 2) or either slightly distal or proximal to it, longitudinal lateroventral carinae on two or more of abdominal segments 2 to 9; anterior

hamules of the male vestigial or absent; and nymphs for which no character is known that will separate them above the generic level. The nymphs of these two groups are unique in having "lost the dentition on one of the ridges of the dorsal plates and on both ridges of the ventral plates (Fig. 5)" (Ferguson-Beatty, 1958, p. 369) of the proventriculus. Also in the nymphs of both groups there are three or four relatively small, single molars in the position of the molar crest on the right mandible and sometimes on the left as well (Watson, 1956, p. 170–190, 199–202).

Several authors have expressed the need for more comparative studies of various organs, structures, or systems to test the classification based primarily on wing venation. Because the proventricular plates in the nymphs of *Synthemis* Selys (Tillyard, 1910, p. 326, fig. 2) and *Presba* Barnard (Barnard, 1937, p. 236, fig. 24) appear to be so very similar, and such that those of *Macromia* (Ferguson-Beatty, 1958, p. 368, figs. 3 and 4) could easily be derived from them, the value of the venational characteristics used by Fraser (1957, p. 106, 109) to place them in two separate families is questionable. For major groupings, we need to know more about parts of the body which could have started to specialize before the elaborate development of the wing venation, as well as more about their ontogeny. For example, in the mature nymph of *Epophthalmia,* the palpal lobes are so bizarre that it is difficult to believe any close relationship exists with the genus *Macromia.* Yet, in the figure of an early instar of *Epophthalmia* (Lieftinck, 1931, p. 78, fig. 27) the lobes are very like those of *Macromia.* Dr. Calvert (1893, p. 212–213) in his discussion of relationships within the Order Odonata mentioned the distinctness of meso- and meta-thoracic ganglia in some groups and their union in others; he also took into consideration the presence or absence of lateral longitudinal carinae on the abdomen. These items are lacking in recent literature on classification.

I am deeply grateful to Dr. E. M. Walker for many helpful suggestions and advice and encouragement; to Dr. Alice Ferguson Beatty for the privilege of studying her unpublished doctorate thesis on the nymphal proventriculus; and to Dr. B. E.

Montgomery for his kindness in supplying information from papers not available to me here.

A number of papers not specifically cited were consulted in obtaining data for this paper, principally those of Barnard, Calvert, Fraser, Lieftinck, Needham, Pinhey, Ris, Tillyard, and Williamson. Those of Dr. Lieftinck with their many illustrations were especially useful.

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Revisional Notes on the Types of Ichneumoninae of Cresson, Cushman, Ashmead and Others

By GERD H. HEINRICH, Dryden, Maine

During January and February 1959 I studied the types of Ichneumoninae in the collections of the Connecticut Agricultural Experimental Station in New Haven, Connecticut, of the Academy of Natural Sciences in Philadelphia, and of the United States National Museum in Washington. As a result of my studies I propose the following changes in the taxonomy as used by Townes in the Catalog (Hymenoptera of America North of Mexico), 1951, for the Ichneumoninae. The entities dealt with will be given in the original combination, followed by the combination as used by Townes, 1951, and lastly by what I consider the correct combination and status.

In a few cases my concept of genera differs from Townes' as applied in the 1951 Catalog. As these differences will become apparent in the following combinations they need to be explained.

The type of the genus *Amblyteles,* the palaearctic species *armatorius* Panzer, is, as indicated by its name, "armed" by strong apophyses of the propodeum, similar to the genus *Hoplismenus.* I do not know at present any other species which I could consider as congeneric with it. Therefore I confine the genus *Amblyteles* to the single palaearctic species, the type of the genus. All North American species of this group that do not belong to *Eutanyacra* Cameron or *Spilichneumon* Thomson I place in the genus *Pseudamblyteles* Ashmead which has as

type a palaearctic species, *palliatorius* Gravenhorst, related to the nearctic *bizonatus* Cresson and *robustus* Cresson.

The genera *Barichneumon* Thomson and *Melanichneumon* Thomson have been synonymized by Townes 1951 and separated again by Walkley 1958. Both possibilities have their strong "pro" and "contra." Although the types of the two genera, *anator* Fabricius and *spectabilis* Homgren respectively, are strikingly different, a great variety of intermediate forms exists. This matter needs further consideration and investigation. In the list below for the time being I am following Townes in lumping all the species into one genus.

I am not fully satisfied with Townes' arrangement of the Platylabini. The type of the genus *Platylabus,* the species *rufus* Wesmael, is characterized by deep, transverse gastrocoeli. I still am convinced that *Asthenolabus* Heinrich with obsolete or subobsolete gastrocoeli must be considered a distinct genus. I am placing in *Platylabus* all species with pronounced gastrocoeli, transverse or not transverse. *Cyclolabus* Heinrich and *Ectopius* Wesmael are distinct genera, both, unlike *Platylabus,* with small, circular or very short oval propodeal spiracles, but distinguished by the difference of the gastrocoeli, which are transverse and pronounced in *Cyclolabus* but obsolete or indicated only by a slight, longitudinal impression in *Ectopius. Cyclolabus* is more closely allied to *Platylabus* than is *Ectopius.*

I acknowledge with gratitude the assistance given to me by the following persons: Dr. F. B. Kring in New Haven, Dr. James A. G. Rehn and Mr. Harold J. Grant, Jr. in Philadelphia and Miss Luella M. Walkley in Washington.

1. *Trogus canadensis Provancher* ♀ = *Conocalama copei* (Cress) ♂ = **Conocalama canadensis** (Provancher), syn. resur. tentat.

The type of *Conocalama copei,* a male from Virginia, has a flat postpetiole without any trace of the conical elevation regarded by Hopper as the distinctive character separating the nearctic genus *Conocalama* Hopper from the palaearctic *Callajoppa* Cameron. As long as we do not know that this char-

acter mutates individually—and so far there seems to be no evidence that it does—we better consider the species *copei* as different from *canadensis,* even though the color is identical. Also the shape of the propodeum of *copei* differs slightly from the norm of *canadensis* in sloping down a little less abruptly and steeply from the ridge formed by the costulae and the carina that replaces the area superomedia, the latter carina not elevated (as is usual in canadensis) and forming a wider arc.

2. *Amblyteles* (*Chasmias*) *pequoitorum* Viereck ♀ = *Ichneumon pequoitorum* (Viereck) = **Coelichneumon pervagus** (Cresson) ♂, new synonymy.

3. *Ichneumon semicoccineus* Cresson ♂ = *Pterocormus rufiventris* (Cresson) = **Ichneumon semicoccineus** Cresson ♂, syn. resur.

The type, a male from "Western Territories," is similar in color to *rufiventris* but distinctly different in morphology. Head and temples are considerably wider, the cheeks shorter, the hind femora much stouter. Also the yellow color of face and clypeus differs from *rufiventris* ♂.

4. *Ichneumon gestuosus* Cresson ♀ = *Melanichneumon gestuosus* (Cresson) ♀ = **Ichneumon gestuosus** Cresson ♀, comb. resur.

5. *Ichneumon lewisi* Cresson ♀ = *Pseudamblyteles lewisi* (Cresson) = **Ichneumon lewisi** Cresson ♀, comb. resur.

6. *Ichneumon inurbanus* Cresson ♀ = *Pterocormus inurbanus* (Cresson) = **Ichneumon semicoccineus** Cresson ♂, new synonymy.

7. *Ichneumon propitius* Cresson ♂ = *Hoplismenus propitius* (Cresson) = **Ichneumon propitius** Cresson ♂, comb. resur.

This species possesses none of the characters which determine the genus *Hoplismenus.* Even the shape of the highly elevated scutellum is different from the norm of the latter genus, and the short protruding corners of the areae dentiparae have but little resemblance to the long apophyses of a typical *Hoplismenus.* In his monograph of the genus, Swift has already

mentioned these facts and has included the species in *Hoplismenus* only because he considered its characters as too little significant for erecting a new genus for it.

The species is a parasite of Nymphalidae, sharing this biological character not only with the genus *Hoplismenus* but also with *Thyrateles* Perkins and furthermore with the *gracilicornis*-group of *Ichneumon* Linnaeus. *Thyrateles*—and also the *gracilicornis*-group—tend morphologically to an elevation of the scutellum and to a deepening of the gastrocoeli as is equally evident in the species under discussion. As *Thyrateles* is confined to species with abdomen amblypygous or semi-amblypygous, the species *propitius* can be placed only in the genus *Ichneumon*, unless a new genus would be erected for it. Even though it differs from the norm of this genus in the areolation of the propodeum, its relationship to *Ichneumon* is further confirmed by the pattern of sexual dichromatism of the species, the females having ferruginous, the males yellow hind tibiae with black apex.

8. *Amblyteles* (*Pterocormus*) *quadrizonatus* Viereck ♂ = *Pterocormus quadrizonatus* (Viereck) = **Ichneumon subdolus** Cresson ♀, new synonymy.

9. *Ichneumon versabilis* Cresson ♂ = *Pterocormus maius* (Cresson) ♀ = **Ichneumon versabilis** Cresson ♂, syn. resur.

The shape of the deep, transverse gastrocoeli of the male type excludes the possibility of associating it with *maius* female, a species with small and shallow gastrocoeli.

10. *Amblyteles balteatus* Hopper ♂ = *Amblyteles rufizonatus* (Cresson) ♀ = **Ichneumon volesus** Cresson ♀, new synonymy.

The deep, transverse gastrocoeli of the male type exclude the generic placement of the species in *Amblyteles* or *Pseudamblyteles*. The new association of the two sexes is obvious.

11. *Amblyteles* (*Pterocormus*) *winkleyi* Viereck ♀ = *Pterocormus instabilis* (Cresson) = **Ichneumon winkleyi** (Viereck) ♀, syn. resur.

I. winkleyi and *instabilis* are two very similar and closely allied but distinct species as I found by careful examination and observation extended over a period of years.

12. *Ichneumon lividulus* Provancher ♀ = *Ichneumon lividulus* Provancher = **Ichneumon zelotypus** Cresson ♂, new synonymy.

Association of sexes concluded from corresponding morphology and from field observation.

13. *Ichneumon juxtus* Cresson ♂ = *Amblyteles juxtus* (Cresson) = **Spilichneumon juxtus** (Cresson) ♂, new comb.

14. *Ichneumon consimilis* Cresson ♂ (preocc.) = *Amblyteles nubivagus* (Cresson) = **Spilichneumon nubivagus** (Cresson), ♂, new comb.

15. *Amblyteles fraternus* Cresson ♂ = *Amblyteles fraternus* Cresson = **Spilichneumon nubivagus** (Cresson) ♂, new comb. and new synonymy.

16. *Ichneumon comes var. aleatorius* Cresson ♂ = *Amblyteles aleatorius* (Cresson) = **Spilichneumon subrufus** (Cresson) ♂, new comb. and new synonymy.

17. *Ichneumon inconstans* Cresson ♂ = *Amblyteles inconstans* (Cresson) = **Spilichneumon subrufus** (Cresson) ♂, new comb. and new synonymy.

18. *Ichneumon koebelei* Swezey = *Pseudamblyteles koebelei* (Swezey) = **Spilichneumon superbus** (Provancher), new comb. and new synonymy.

19. *Ichneumon torvinus* Cresson ♂ = *Chasmias torvinus* (Cresson) = **Chasmias saucius** (Cresson) ♀, new synonymy.

20. *Ichneumon procax* Cresson ♂ = *Ichneumon procax* Cresson = **Thyrateles procax** (Cresson) ♂, new comb.

The female of this species (see below) is amblypygous. Consequently it can not be regarded as an *Ichneumon.* The deep and large gastrocoeli with strongly developed thyridia, the elevated scutellum and the biological fact of parasitism on Nymphalidae establish satisfactorily its position within the genus *Thyrateles* Perkins, although the extremely spinose tarsi

of *procax* form a peculiar character not present in the other species of the genus.

21. *Amblyteles torontosus* Davis ♀ = *Amblyteles torontosus* Davis = **Thyrateles procax** (Cresson) ♂, new comb. and new synonymy.

The association of sexes has been proved by a series of both males and females reared from the same host (Canadian National Collection).

22. *Amblyteles mormonus* Cresson ♀ = *Pseudamblyteles mormonus* (Cresson) = **Thyrateles mormonus** (Cresson) ♀, new comb.

This species is closely related to *camelinus* Wesm., the palaearctic type of the genus *Thyrateles*.

23. *Ichneumon marianapolitanensis* Provancher ♀ = *Amblyteles rufizonatus* (Cresson) ♀ = **Ctenichneumon syphax** (Cresson) ♀, new comb. and new synonymy.

This is a dichromatic species, occurring regularly in two differently colored phases, the one with segments 2–7 red (*syphax*), the other with only 2–3 red, 4–7 being black (*rufizonatus*).

24. *Amblyteles perannulatus* Hopper ♀ = *Amblyteles perannulatus* Hopper = **Eutanyacra perannulata** (Hopper) ♀, new comb.

25. *Ichneumon nobilis* Cresson ♂ = *Pseudamblyteles munificus* (Cresson) ♂ = **Eutanyacra munifica** (Cresson) ♂, new comb.

26. *Ichneumon grotei* Cresson ♂ = *Pseudamblyteles grotei* (Cresson) = **Eutanyacra suturalis** (Say) ♀, new comb. and new synonymy.

The association of *propinquus* Cresson ♀ and *grotei* ♂ has been proved by a series of both males and females reared from the same host (Can. Natl. Coll.).—The original description of *suturalis* could be applied to a number of different species, all

equally matching it. As the type is lost I accept according to the principle of priority the synonymy of *propinquus* and *suturalis* as established by Townes.

27. *Ichneumon rubellus* Cresson ♂ = *Pseudamblyteles animosus var. rubellus* (Cresson) = **Pseudamblyteles rubellus** (Cresson) ♂.

Differences in the gastrocoeli indicate that *rubellus* is a distinct species, not a mere variety of *animosus*.

29. *Ichneumon infidelis* Cresson ♂ = *Pterocormus infidelis* (Cresson) = **Intermedichneumon calcatorius** (Thunberg) ♂, new synonymy.

30. *Platylabus opacitas* Davis ♂ = *Aoplus opacitas* (Davis) = **Aoplus cestus** (Cresson) ♀, new synonymy.

31. *Ichneumon sitkensis* Ashmead ♂ = *Aoplus vagans sitkensis* (Ashmead) = **Aoplus ruficeps sitkensis** (Ashmead) ♂, new comb.

The type (from Alaska) differs from the eastern subspecies *ruficeps vagans* Provancher only in the lack of the white annulus of flagellum.

32. *Ichneumon helvipes* Cresson ♀ = *Melanichneumon helvipes* (Cresson) = **Melanichneumon anator** (Fabricius) ♀, new synonymy.

33. *Ichneumon blanchardi* Davis ♀ = *Melanichneumon rubicundus* (Cresson) ♀ = **Melanichneumon blanchardi** (Davis) ♀, syn. resur.

M. rubicundus auct. is a complex species, probably better placed in a genus other than *Melanichneumon*, which would also contain *annulicornis* Ashm. The species *blanchardi* ♀ may be separated from *mucronatus* Provancher ♂ and *annulicornis* ♀ by the somewhat shorter propodeum with consequently shorter areae dentiparae and superomedia, and by the lack of teeth of the propodeum. The type of *rubicundus* ♀ has distinct apophyses of the propodeum as has *mucronatus* ♂. Whether both can be associated as sexes of the same species needs to be investi-

gated and seems to be doubtful. If they are not the same, *rubicundus* (preocc.) will have to be renamed.

34. *Ichneumon belfragei* Cresson ♂ = *Pseudamblyteles belfragei* (Cresson) = **Melanichneumon belfragei** (Cresson) ♂, new comb.

35. *Amblyteles ohioensis* de Gant ♂ = *Melanichneumon gestuosus* (Cresson) ♂ = **Melanichneumon nigripes** (Provancher) ♂, new synonymy.

In this species mutants with partially obscure reddish color on the second or second and third tergite, as represented by the type specimen of *nigripes*, are rare in the male sex, but rather common in females.

36. *Cratichneumon pluto* Viereck ♂ = *Melanichneumon gestuosus* (Cresson) ♂ = **Melanichneumon nigripes** (Provancher) ♂, new synonymy.

37. *Ichneumon cordatus* Cresson ♂ = *Melanichneumon cordatus* (Cresson) = **Melanichneumon subcyaneus cordatus** (Cresson) ♂, new status.

I. cordatus evidently is nothing more than the western, less white-marked form of *subcyaneus*.

38. *Ichneumon solitus* Cresson ♀ = *Melanichneumon solitus* (Cresson) = **Melanichneumon subcyaneus cordatus** (Cresson) ♂, new synonymy.

The other sex of the former species.

39. *Ichneumon neutralis* Cresson ♂ = *Ichneumon neutralis* (Cresson) = **Melanichneumon subcyaneus neutralis** Cresson ♂, new comb. and new status.

This is another bluish-black *Melanichneumon* male, distinguished by entirely black hind legs. I suppose that this also belongs to *subcyaneus* as a geographical subspecies.

40. *Ichneumon ornatipes* Cresson ♂ = *Melanichneumon ornatipes* (Cresson) = **Melanichneumon virginicus** (Cresson) ♀, new synonymy.

M. virginicus ♀ has two striking and unique characters: the clypeus is extraordinarily widened and very deeply depressed, and the hind femora are unusually short and thick. The same features are evident in *ornatipes* ♂, except that the clypeal character is developed to a much lesser degree as is to be expected according to the rules of normal sexual dimorphism. The striking difference in color (red abdomen in the female, black abdomen in the male) represents in the Nearctic Region a rather typical phenomenon, well known in the genera *Probolus, Ctenichneumon, Tricholabus* and *Pristiceros* but until now not observed in *Melanichneumon*. Nevertheless the association of sexes may be considered in all probability as correct.

41. *Ichneumon pusillus* Cresson ♀ = *Cratichneumon paratus* (Say) = **Cratichneumon pusillus** (Cresson) ♀, syn. resur.

The type, a very small specimen from Delaware, shows no trace of the little scopula which, as far as my experience goes, is constantly present in *paratus* females. It also differs from the latter in color pattern of the legs and in size. Therefore I do not believe that the species *pusillus* could possibly be regarded as a synonym of *paratus*. I rather suspect its specific identity with *annulatipes* Provancher ♀. However, even if this should be true, it would probably represent a differently colored southern subspecies. Our knowledge of this extremely difficult group of numerous small *Cratichneumon* species is still so poor and defective that the attempt of subspecific associations should be postponed.

42. *Ichneumon kincaidi* Ashmead ♂ = *Cratichneumon kincaidi* (Ashmead) ♂ = **Cratichneumon citrinops kincaidi** (Ashmead) ♂, new comb.

European specimens of *citrinops* Wesmael differ from Alaskan specimens on *kincaidi* in nothing except the color of femora III which are red with black apex in the former, entirely infuscated in the latter.

43. *Amblyteles* (*Pterocormus*) *quintilis* Viereck ♂ = *Cratichneumon quintilis* (Viereck) = **Cratichneumon annulatipes** (Provancher) ♀, new synonymy.

Cr. quintilis ♂ is well distinguished from all similar male species of the genus occurring in the Eastern Canadian Zone by the long row of tyloides beginning on the 2nd or 3rd joint of flagellum, and by the sternauli on the mesosternum unusually strongly impressed. The association of the sexes I concluded from observations in the field and matching characters.

44. *Ischnus volens* Cresson ♂ = *Cratichneumon volens* (Cresson) = **Cratichneumon brevipennis** (Cresson) ♀, new synonymy.

An aberrant species of the genus, unmistakably characterized by the presence of several irregular vertical carinae on the frons, which are strongly developed in the female, weakly in the male.

45. *Ichneumon brevipennis* Cresson ♀ = *Ichneumon brevipennis* (Cresson) = **Cratichneumon brevipennis** (Cresson) ♀, new comb.

46. *Ischnus variegatus* Provancher ♂ = *Cratichneumon W-album* (Townes nec Cresson) = **Cratichneumon variegatus** (Provancher) ♂, syn. resur.

The specimen in the Cresson collection designated as the lectotype of *I. W-album* does not match the original description of the latter in characters of specific distinction. As the collection contains no specimen which does match the description, I have reported the type as to be considered as lost. The specimen wrongly designated as type of *W-album* is specifically identical with *I. variegatus* which therefore is the correct name for the species *W-album* of authors.

47. *Cratichneumon popofensis* Ashmead ♀ = *Cratichneumon popofensis* Ashmead = **Cratichneumon yakutatensis** Ashmead ♂, new synonymy.

I found no reason for separating these two well matched sexes as different species, especially so since a male specimen of *yuka-*

tatensis from Popoff Island (the terra typica of *popofensis*) is in the collection of the U. S. National Museum.

48. *Anisobas nearcticus* Cushman ♀ = *Anisobas texensis* (Ashmead) = *Anisobas texensis nearcticus* Cushman ♀, syn. resur.

The type of *nearcticus* as well as two specimens in my collection, all from Maine, differ slightly in color from the type of *texensis*. They all have the white stripe of the outer orbits considerably abbreviated and the 4th tergite black only at the apex and with white apical band either lacking or strongly reduced. They are all considerably smaller than *texensis* and have the apex of the flagellum a little less sharply attenuated. I therefore would prefer to maintain the name *nearcticus* with subspecific status.

49. *Eurylabus agilis* Cresson ♀ = *Platylabus scutellatus* (Provancher) = **Asthenolabus agilis** (Cresson) ♀, syn. resur. and new comb.

P. agilis is undoubtedly a distinct species, differing from *scutellatus* (a species also belonging to the genus *Asthenolabus* Heinrich) by the lack of white anal markings.

50. *Platylabus metallicus* Bradley ♀ = *Platylabus clarus* (Cresson) = **Platylabus metallicus** Bradley ♀, syn. resur.

There seems to be no doubt that this is a distinct species, constantly different from *clarus* in its smaller size, less extended white marks (for example the upper margin of pronotum never being entirely white, usually entirely blue), and a little more widened flagellum.

51. *Platylabus montanus* Cresson ♀ = *Ichneumon vafer* Cresson "♀" = ♂ (preocc.) = **Platylabus perkinsi** Walkley, new synonymy.

52. *Platylabus consors* Cresson ♂ = *Platylabus consors* Cresson = **Platylabus rufipes consors** Cresson ♂, new comb. and status.

Differs from *rufipes rufipes* Provancher only by lack of the white annulus on flagellum.

53. *Platylabus californicus* Cresson ♀ = *Platylabus californicus* Cresson = **Platylabus rufipes consors** Cresson ♀, new synonymy.

54. *Probolus subdentatus* Ashmead ♂ = *Ectopius subdentatus* (Ashmead) = **Cyclolabus gracilicornis subdentatus** (Ashmead) ♂, new status.

The western subspecies *subdentatus* differs from the eastern *gracilicornis gracilicornis* Provancher only in the lack of the white annulus of the flagellum, thus paralleling *Platylabus rufipes rufipes* Provancher (Eastern) and *Platylabus rufipes consors* Cresson (Western).

55. *Hoplismenus ornatus* Cresson ♀ = *Thaumatoteles ornatus* (Cresson) = **Ambloplisus ornatus** (Cresson) ♀, new comb.

The genus *Ambloplisus* Heinrich was erected in 1930 (Mitt. Zool. Mus. Berlin, XV, 3/4, p. 551) for the Peruvian species *primus* Heinrich, which is congeneric with *ornatus*.

56. *Platylabus foxi* Davis ♂ = *Thaumatoteles ornatus* (Cresson) = **Tropicolabus foxi** Davis ♂, syn. resur. and new genus.

The type of *Platylabus foxi,* made here the type of the new genus *Tropicolabus,* differs morphologically from the genus *Ambloplisus* Heinrich (syn. *Thaumatoteles* Hopper) in the shape of the head, scutellum, propodeum, first segment and gastrocoeli. The gastrocoeli which as a general rule do not undergo considerable sexual dimorphism are deep and extremely wide with just a very narrow interval between them. The species therefore can not be placed in the genus *Ambloplisus* or *Hoploplatystylus* Schmiedeknecht. It could eventually pass as a member of the genus *Platylabus* except for the very strong, long and somewhat upwards curbed apophyses of the propodeum, which may be considered as the character separating *Tropicolabus* from *Platylabus.*

57. *Hoplismenus transversus* Davis ♂ = *Hoplismenus scutellatus* (Provancher) = **Hoplismenus scutellatus transversus** Davis ♂, new status.

There seem to be no morphological differences between *scutellatus* (from Quebec) and *transversus* (from Idaho). The color differences, however, are significant enough to indicate a subspecific differentiation. *H. scutellatus transversus* differs from *scutellatus scutellatus* by its 1) almost entirely red mesonotum, 2) entirely red abdomen, 3) lack of annulus on flagellum.

Some North American Collembola Records

By David L. Wray, Division of Entomology, North Carolina Department of Agriculture, Raleigh, N. C.

During the past number of years I have been working on the Collembola fauna of North America and have been able to examine many collections from most of the region. The following records of the occurrence of Collembola seem worthy of note.

Subfamily Onychiurinae Börner, 1901

Onychiurus cocklei Folsom

One of the most interesting accounts of the occurrence of Collembola, and I might add most intriguing to collectors, is that given by J. W. Folsom entitled "The Golden Snow-Flea, *Aphorura cocklei*, n.sp." This appeared in The Canadian Entomologist (vol. XL) in 1908 and described the swarming in Kaslo, British Columbia of "a minute yellow Collembolan that appears in crowds so dense as to cover the snow with a carpet of gold." It was of particular interest to me when this species was discovered here in the mountains of North Carolina swarming in (7) January 1955. They were found swarming by the millions over logs and over the surface of the water of a 2 acre pond near Black Mountain, N. C. Also strips of them were

along the slow moving waters of the stream flowing from the pond. They formed a floating blanket of gold on the surface of the water. In the laboratory they appeared a lemon yellow color. This seems to be the first time this species has been recorded in eastern North America.

Another record of *Onychiurus cocklei* Folsom is from Brightwood, Oregon. Numerous specimens were taken from humus on June 28, 1957 and sent me for identification by Dr. G. F. Knowlton.

Kalaphorura burmeister Lubbock

Among some Collembola sent me for identification were a number of this species which were taken from soil from Wien, Austria and intercepted at Fort Lauderdale, Florida by H. A. Denmark.

Subfamily Isotominae Schäffer, 1896

Pseudanurphorus binoculatus Kseneman

Specimens were taken from soil of a lake bed near Oak Ridge, Tennessee on July 3, 1957 and sent me for determination by S. I. Auerbach. Heretofore this species has only been recorded from Connecticut in 1951, by P. F. Bellinger. I have found another *Pseudanurophorus* with two eyes on each side of head taken in Utah. A description of this form is now in press.

Micrisotoma achromata Bellinger

Specimens of this species were taken from leaf mould at 4200 feet elevation on June 30, 1954 near Highlands, North Carolina. Heretofore this form has only been recorded from Connecticut.

Architomocerura crassicauda Denis

Specimens of this form were taken in leaf mould from London County, Tennessee, April 27, 1952, by T. P. Copeland and sent me for identification.

Subisotoma (Proisotoma) angularis (Axelson)

Specimens of this species were taken from ground cover under a juniper tree at Moab, Utah, March 4, 1955, and sent me by G. F. Knowlton.

Subfamily Entomobryinae Schäffer, 1896

Entomobrya stachi Wray

Entomobrya decemfasciata Packard, Christiansen, 1958, new synonymy

This is one of the largest and distinct species of *Entomobrya* found in North America and can be easily recognized. It was discovered at Highlands, N. C. Since then specimens have been identified from Tishomingo, Mississippi, which were taken from under bark and moss by W. E. Snow, March 23, 1957. Other specimens were taken from tree boles at Oak Ridge, Tennessee, in 1955 by S. I. Auerbach. This form was erroneously listed under *Entomobrya decemfasciata* by Christiansen (1958).

Tomocerus minor Lubbock

Taken from Orchid plants from Guatemala, South America, August 22, 1958. This is an unusual record for this species because heretofore most records have been from Arctic regions, Europe, Canada, northern U. S. (Mass., Washington), and New Zealand.

Subfamily Paronellinae Börner, 1906

Paronellides mjöbergi Schött

This interesting Australian species was intercepted on a plant from Australia, January 1959.

Recent Smithsonian Institution Entomological Accessions

By J. F. Gates Clarke, Curator, Division of Insects, Smithsonian Institution

The collections listed below have been received recently at the U. S. National Museum, Smithsonian Institution. The purpose of publishing this announcement is to inform the entomological public of the availability of these collections for study and to apprise those interested of the location of the types contained.

These newly acquired collections, together with others already assembled in the National Collection, will permit exhaustive studies embracing the biological and distributional features of the groups represented, and will be available to interested students who wish to undertake such studies.

Ernest Shoemaker Collection

The late Ernest Shoemaker, Brooklyn, New York, amateur entomologist and painter of insects, presented his collection of well over 60,000 insects, mostly beetles, to the Smithsonian Institution.

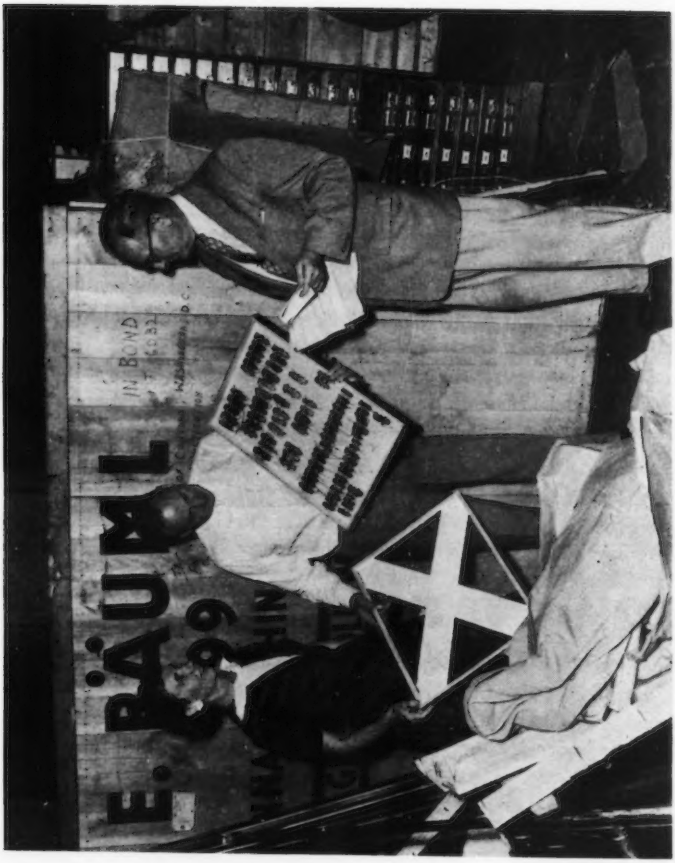
Mr. Shoemaker began collecting insects 75 years ago when he was a young man living in Georgetown and this hobby occupied nearly all his spare time until his death.

His exquisitely prepared specimens are of particular interest because many of them came from collecting grounds in the Eastern United States that have disappeared because of the growth of cities. His fine series are of special value for population and distribution studies.

The collection also contains a large number of lepidoptera, but the most important are the 101 species of *Morpho* butterflies which were favorites of Mr. Shoemaker.

Friedrich F. Tippmann Collection

The Tippmann Collection consists exclusively of Cerambycidae and contains approximately 98,000 specimens and 16,500 spe-



Arrival of Friedrich F. Tippmann Collection at U. S. National Museum. Miss Helena M. Weiss, Registrar, J. F. Gates Clarke, Curator of Insects, Wert T. Bayne, Customs Inspector.

cies. Included in this collection are 615 holotypes and over 1,400 paratypes of such authors as Bruening, Aurivillius, Pic, and Tippmann, as well as many others.

In this collection there are practically no North American species but it is rich in South American forms. Africa, Asia, Europe, New Guinea and the Indo-Malayan area are also well represented.

Paul J. Spangler Collection

The gift of 26,385 specimens from Mr. Spangler has provided much material that should be of interest to students.

This collection, almost wholly coleoptera, is very rich in aquatic forms in which the donor specialized. Although the material is largely North American, there is good representation from the Palaearctic and Neotropical Regions. In addition to types of Spangler's own species there are paratypes of other authors such as J. B. Wallis and Frank Young.

Francisco de Assisi Monrós Collection

Through the kindness of Mrs. Maria Muntañola Monrós, the magnificent world-wide collection of Chrysomelidae, assembled by her late husband, has been received at the U. S. National Museum. The superb condition of the material reflects the meticulous care with which Dr. Monrós worked.

In all, there are 54,245 specimens of which 244 are holotypes and 1,356 are paratypes, cotypes or allotypes; 923 species are represented by types of one sort or another.

Of the 16 subfamilies the Criocerinae, Chlamidinae, Eumolpinae, and Clytrinae, groups in which Dr. Monrós was particularly interested, are especially well represented by types.

A Sex Anomaly of the Introduced Pine Sawfly, Diprion similis (Htg.) (Hymenoptera: Diprionidae) [1]

By HARRY C. COPPEL [2]

During investigations on the biological control of the introduced pine sawfly, *Diprion similis* (Htg.), in northwestern Wisconsin, in 1958, 1,024 adult sawflies were reared, one of which was a sex anomaly. This specimen emerged from a large cocoon (9.2 mm.), from which one would expect a female adult. The head is typical of the male except for the distinctly yellow clypeus as in the female. The thorax and abdomen are divided laterally, the right side as in the female and the left side as in the male. The genital segments are typically male and the genital capsule appears to have revolved almost a complete 180°. In contrast to the normal male, however, the hypandrium is not broadly rounded posteriorly, but is sharply and deeply indented posteriorly. The base of the hypandrium on the right side is slightly misshapen because of the attachment of a membrane bearing the first and second valvulae and their rami. This structure hangs loosely from the body of the adult. The hypandrium is further misshapen on its right lateral margin by the presence of what appears to be a shrunken and degenerate third valvula. An examination of the internal organs showed no evidence of a female reproduction system or of eggs. Whether the sex anomaly was a functional male is not known.

[1] Approved for publication by the Director of the Wisconsin Agricultural Experiment Station. This work was done in cooperation with the Wisconsin Conservation Department.

[2] Assistant Professor, Department of Entomology, University of Wisconsin, Madison 6, Wisconsin.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Tenebrionidae of the World wanted, in exchange for insects of Argentina and neighboring countries. Horacio J. Molinari, Av. Lib. Gral. San Martin 55, Acassuso (Buenos Aires), Rep. Argentina.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Zămberk 797, Czechoslovakia.

Wanted and Needed. We are compiling a history of entomology, and particularly, at present, of the amateur insect clubs that flourished 50 to 75 years ago. Will you who have knowledge of such early clubs or societies advise me, giving facts on the time of existence, members, etc., which you may have. J. J. Davis, Dept. of Entomology, Purdue University, Lafayette, Indiana.

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A TAXONOMIC STUDY OF THE NORTH AMERICAN LICININI WITH NOTES ON THE OLD WORLD SPECIES OF THE GENUS DIPLOCHEILA BRULLE (COLEOPTERA)

By George E. Ball

258 pages of text, 75 tables, 3 diagrams, 15 plates, table of contents and index

This monograph considers the geographical variation, relationships, evolution and taxonomy of the carabid tribe Licinini. A general treatment, explaining the taxonomic approach used, definition of terms, criteria for delimiting species and subspecies, etc., precedes the systematic position. The genera *Diplocheila* (subgenera *Diplocheila, Neorembus, Isorembus*), *Dicaelus* (subgenera *Paradicaelus, Dicaelus, Liodicaelus*) and *Badister* (subgenera *Badister, Trimorphus, Baudia*) are each treated in some detail. Keys to the genera and species are given throughout as well as a description (or diagnostic notes), variation, distribution and frequently locality records for each of the forms treated. The phylogeny and zoogeography of each genus are discussed in a separate section. Variation of mensurable characters is treated in the 75 tables. Fifteen plates depict structural (including genitalia) and variational features of the species discussed.

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